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METEOROLOGICAL BRANCH - DEPARTMENT OF TRANSPORT - CANADA

AERIAL SEA ICE OBSERVING AND RECONNAISSANCE

CANADIAN WESTERN ARCTIC, 1960.

UDC: 551.311.181

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By

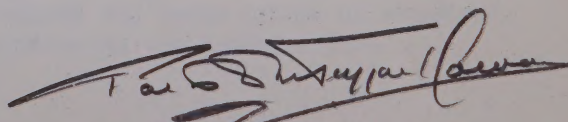
D. C. Archibald, M. N. Monsinger, T. B. Kilpatrick.

This is the eighth technical report in the series concerning ice conditions observed by aerial ice reconnaissance conducted by the Basic Weather Division, Meteorological Branch, Department of Transport.

This technical report describes ice conditions with regard to ice coverage, age, topography, puddling, snow cover, ice of land origin, and water features over the Canadian Western Arctic for the period April to November, 1960.

This is the fourth technical report covering observed ice conditions in the Canadian Western Arctic. Ice conditions in 1957 were described in Circular 3254, Tec 310, 17 September 1959. Ice conditions in 1958 were described in Circular 3387, Tec 332, 8 September 1960. Ice conditions in 1959 were described in Circular 3427, Tec 340, 20 September 1960.

Approved



P. D. McTaggart-Cowan,
Director,
Meteorological Branch.

UDC: 551.311.181

AERIAL SEA ICE OBSERVING AND RECONNAISSANCE

CANADIAN WESTERN ARCTIC-1960

During 1960, a field ice reconnaissance unit was established at Cambridge Bay, N.W.T., to carry out aerial ice reconnaissance in the Canadian Western Arctic. The area covered by the survey is outlined in Figure 1. The Ice Observer-in-Charge of this field unit was Mr. P. Chirba, and other ice observers were Mr. D. W. Hall and Mr. E. A. Proszny.

An aircraft char (iii) by the Meteorological Branch was used to provide two complete coverages in the area during April and May to obtain the break-up pattern. During the period July to October an aircraft was again chartered by the Meteorological Branch to do coverage in this area. To supplement these flights, ice observers were occasionally accommodated on lateral flights through the co-operation of General Electric Corporation.

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Flight time for this operation is shown in the table on page 2. The two preliminary flights were conducted over the area in April and May, and frequent flights started out in June, July, August, September and October.

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The descriptions and charts provide a representative picture of ice conditions during the 1960 ice season.

We are indebted to Messrs. A. W. Smith and D. Anton who prepared the ice charts; to Mr. A. W. Smith who prepared the description of observed ice conditions; and to Mr. E. Shuychyn who co-ordinated the information.

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Reports of ice reconnaissance flights were transmitted to Meteorological Headquarters and Ice Central Halifax. Forecasts of ice conditions were also issued by the ice forecaster at Cambridge Bay, N.W.T. As required, ice information was transmitted directly from the aircraft to ship officers whilst shipping was in the area.

Ice conditions observed in the Canadian Western Arctic during the period from April to October, 1960, are described on pages 10 to 28. The accompanying charts, figures 1 to 10, describe ice conditions at the indicated dates. Coverage of the whole area on the same day was seldom possible and figures represent ice conditions as observed on several flights between the indicated dates.

The descriptions and charts provide a representative picture of ice conditions during the 1960 ice season.

We are indebted to Messrs. A. W. Smith and D. Aston who prepared the ice charts; to Mr. A. W. Smith who prepared the description of observed ice conditions, and to Mr. E. Stasyshyn who co-ordinated the information.

TABLE OF ICE RECONNAISSANCE FLIGHTS

Long Range Ice Reconnaissance Flights (Canadian Western Arctic)
April 25-26, 1960, and May 23-24, 1960.

<u>OBSERVER</u>	<u>FLIGHT NUMBER</u>	<u>TOTAL FLYING HOURS</u>	<u>MILES STATUTE</u>
Stasyshyn, E.)	1	12.1	2090
Smith, A. W.)			
Sumara, R. R.)			
Spirito, J. G.)			
Stasyshyn, E.)	2	12.9	2225
Moore, R. G.)			
Lewis, A. J.)			
Veinot, D. S.)			
Meek, G. T.)			

Total number of flights	2
Total number of flying hours	25.0
Total number of statute miles flown	4315

Medium Range Ice Reconnaissance and Observation Flights
Period: June 29 to October 23, 1960.

<u>OBSERVER</u>	<u>NUMBER OF FLIGHTS</u>	<u>TOTAL FLYING HOURS</u>	<u>MILES STATUTE</u>
Chirka, P.	10	35.7	6126
Hall, D. W.	20	68.2	11685
Prozny, E. A.	25	73.7	12509
Total number of flights for all observers	55		
Total number of flying hours	177.6		
Total number of statute miles flown	30320		

TABLE OF ICE RECONNAISSANCE FLIGHTS

<u>DATE</u>	<u>AREA</u>	<u>FLYING HOURS</u>	<u>ICE OBSERVERS</u>
April 25/26, 1960.	Beaufort Sea, Amundsen Gulf, Dolphin & Union Strait, Coronation Gulf, Dease Strait, Queen Maud Gulf, Simpson Strait, Rae Strait, James Ross Strait.	12.1	E. Stasyshyn, A.W. Smith, J.G. Spirito, R.R. Sumara.
May 23/24, 1960.	Beaufort Sea, Amundsen Gulf, Dolphin & Union Strait, Coronation Gulf, Dease Strait, Queen Maud Gulf, Simpson Strait, Rae Strait, James Ross Strait.	12.9	E. Stasyshyn, R.G. Moore, A.J. Lewis, D.S. Veinot, G.T. Meek.
June 29, 1960.	Dease Strait, Western Queen Maud Gulf.	0.6	P. Chirka, E. Prozny, T.B. Kilpatrick.
July 5, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, Simpson Strait, Rasmussen Basin, Rae Strait, James Ross Strait.	5.9	E. Prozny
July 10, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, South Amundsen Gulf.	2.8	D.W. Hall, T.B. Kilpatrick.
July 13, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, South Amundsen Gulf.	3.6	P. Chirka
July 14, 1960.	Amundsen Gulf, Beaufort Sea.	5.2	P. Chirka, D.W. Hall.
July 15, 1960.	Amundsen Gulf, Dolphin & Union Strait, Coronation Gulf, Dease Strait.	4.1	P. Chirka.
July 15, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, South M ^c Clintock Channel, Franklin Strait, Rae Strait, Simpson Strait, Rasmussen Basin, James Ross Strait.	3.9	E. Prozny
July 18, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait	4.5	E. Prozny

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<u>DATE</u>	<u>AREA</u>	<u>FLYING HOURS</u>	<u>ICE OBSERVERS</u>
July 23, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, Simpson Strait, Rasmussen Basin, Rae Strait, James Ross Strait.	4.5	P. Chirka
July 25, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, Eastern Amundsen Gulf.	5.7	E. Prozny
July 27, 1960.	Southwestern Amundsen Gulf, Beaufort Sea.	2.9	D.W. Hall
August 4, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, Simpson Strait.	2.8	P. Chirka
August 5, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, Amundsen Gulf.	4.2	E. Prozny
August 5, 1960.	Western Amundsen Gulf, Beaufort Sea.	5.1	D.W. Hall
August 6, 1960.	Amundsen Gulf, Dolphin & Union Strait, Coronation Gulf, Dease Strait.	3.0	E. Prozny, D.W. Hall.
August 14, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, Franklin Strait, Rasmussen Basin, Rae Strait, Simpson Strait, James Ross Strait.	4.1	D.W. Hall
August 15, 1960.	Dease Strait, Coronation Gulf.	1.4	P. Chirka, D.W. Hall.
August 16, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, James Ross Strait, Rae Strait, Simpson Strait, Rasmussen Basin.	4.2	E. Prozny
August 20, 1960.	Dease Strait, Queen Maud Gulf, Victoria Strait, Simpson Strait, Rasmussen Basin, Rae Strait, James Ross Strait.	3.8	P. Chirka, D.W. Hall.
August 22, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, Eastern Amundsen Gulf.	2.3	E. Prozny, D.W. Hall.
August 23, 1960.	Amundsen Gulf, Northern Dease Strait.	5.1	E. Prozny, D.W. Hall.




















<u>DATE</u>	<u>AREA</u>	<u>FLYING HOURS</u>	<u>ICE OBSERVERS</u>
August 28, 1960.	Dease Strait, Northern Queen Maud Gulf, Victoria Strait, James Ross Strait.	3.6	P. Chirka, D.W. Hall.
August 31, 1960.	Dease Strait, Northern Queen Maud Gulf, Victoria Strait, James Ross Strait.	3.9	P. Chirka.
September 6, 1960.	Victoria Strait, James Ross Strait.	3.8	D.W. Hall.
September 7, 1960.	Victoria Strait, James Ross Strait.	4.1	D.W. Hall, E. Prozny.
September 8, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, Amundsen Gulf.	4.1	D.W. Hall.
September 9, 1960.	Southern Beaufort Sea.	1.9	D.W. Hall.
September 10, 1960.	Southeastern Beaufort Sea, Northern Amundsen Gulf.	5.3	D.W. Hall.
September 13, 1960.	Victoria Strait, M'Clintock Channel.	2.2	E. Prozny.
October 1, 1960.	Dease Strait, Victoria Strait.	1.8	E. Prozny.
October 19, 1960.	Victoria Strait, Franklin Strait, M'Clintock Channel, James Ross Strait, Rae Strait.	6.3	D.W. Hall.
October 22, 1960.	Dease Strait, Coronation Gulf, Dolphin & Union Strait, Amundsen Gulf, Beaufort Sea.	11.1	E. Prozny.
October 29, 1960.	Dease Strait, Queen Maud Gulf.	2.1	D.W. Hall.

DESCRIPTIVE TERMS USED IN THIS REPORT

- | | |
|---------------------|--|
| a) Ice Free | No ice present. |
| b) Open Water | Less than 1/10 ice cover. |
| c) Scattered Ice | 1/10 to 5/10 ice cover. |
| d) Broken Ice | 5/10 to 8/10 ice cover. |
| e) Close Ice | 8/10 to 10/10 ice cover. |
| f) Consolidated Ice | 10/10, little or no water present
on the sea-surface. |
| g) Brash | Floes less than 6 feet across. |
| h) Block | Floes from 6 feet to 30 feet across. |
| i) Small Floe | Floes from 30 feet to 600 feet across. |
| j) Medium Floe | Floes from 600 feet to 3000 feet across. |
| k) Giant Floe | Floes from 3000 feet to 5 miles across. |
| l) Ice Field | Floes more than 5 miles across. |

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KEY TO ICE SYMBOLS

CONCENTRATION	AGE	ICE OF LAND ORIGIN
 < 0.1 coverage	<i>A</i> dominant, secondary	 Icebergs (<i>many</i>)  Icebergs (<i>few</i>)
 0.1 to 0.5 coverage	<i>Sl</i> - Slush <i>Y</i> - Young Ice <i>W</i> - Winter Ice <i>Pl</i> - Polar Ice	 Bergy bits and growlers (<i>many</i>)  Bergy bits and growlers (<i>few</i>)
 0.5 to 0.8 coverage	Examples: <i>A</i> , <i>A</i> , etc. <i>Sl, W Pl</i>	
 0.8 to 1.0 coverage		
 1.0 coverage (<i>no water</i>)		
CONCENTRATION BY SIZE	PUDDLES	WATER FEATURES
$\frac{C_n}{n_1, n_2, n_3}$	$\frac{Pd}{}$ dominant condition	 Crack  Lead
n_1 - tenths of slush, brash and block	Tenths of ice covered if not frozen or rotten	 Polynya
n_2 - tenths of small and medium floes	<i>F</i> - Frozen <i>R</i> - Rotten	
n_3 - tenths of giant floes and field		
TOPOGRAPHY	THICKNESS OF SEA ICE AND SNOW	BOUNDARY
 Rafted ice	Examples: $\frac{Pd, Pd, Pd}{3 F R}$ etc.	 Known  Radar  Assumed  Limit of Estimated data
 Ridged ice	$T, S,$ where <i>n</i> - nearest ft. <i>n n</i>	
 Hummocks	Examples: $\frac{T, S}{5 2}$ etc.	

Symbols used for Recording the Various Ice, Snow, and Water Features.

1. The first part of the report

is devoted to the description of the

2. The second part of the report

is devoted to the description of the

results of the experiments and the

discussion of the results.

The results of the experiments are

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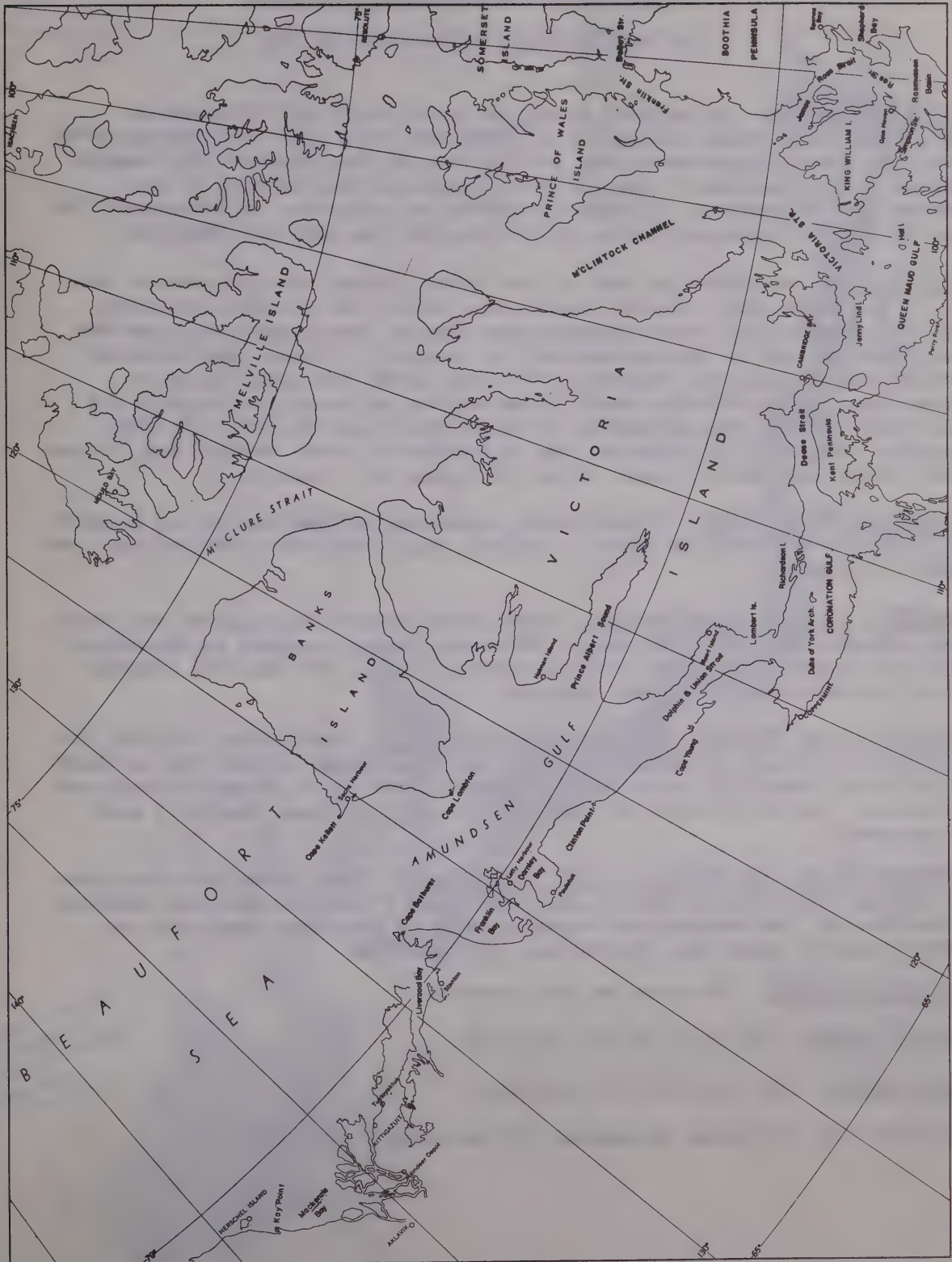


Chart of Place Names - Canadian Western Arctic

ICE CONDITIONS ON APRIL 25 - 26, 1960.

Ice conditions are illustrated in fig. 1

BEAUFORT SEA: Fast ice extended twenty to thirty miles off the mainland coast, with close mainly winter ice in giant and field floes continuing northwards. An area of open water into the vicinity of Cape Bathurst led towards Amundsen Gulf. Numerous cracks, leads and small polynia existed in the Amundsen Gulf approaches. Ridging throughout was moderate. The Liverpool Bay area and the north-eastern sector of the Beaufort Sea were not observed.

AMUNDSEN GULF: An extensive area of open water covered the west-central portion of the gulf. Fast ice and consolidated winter ice extended eastwards from Cape Bathurst and across Franklin Bay towards Cape Lambton to cover the whole observed area of the eastern half of the gulf. A shore lead extended north-westwards from Cape Lambton, with close winter and young ice up to medium floes in the offshore area. Close winter and young ice in giant and field floes covered the approaches to the south of Cape Kellett. Ridging throughout was light to moderate. The Sachs Harbour area, Darnley Bay, Prince Albert Sound, and central areas of the gulf were not observed.

DOLPHIN AND UNION STRAIT: Consolidated, moderately-ridged winter ice in giant and field floes covered the area. A polynia and cracks were observed near the Lambert Islands.

CORONATION GULF AND DEASE STRAIT: Consolidated winter ice in giant and field floes extended throughout the area. Moderate ridging occurred in Coronation Gulf, with light ridging and cracks in Dease Strait. The mainland coastal area of Coronation Gulf was not observed.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Predominantly winter ice in moderately ridged and hummocked giant and field floes covered the northern half of Queen Maud Gulf, with lightly ridged winter ice in Simpson Strait and approaches. Victoria Strait and the southern half of Queen Maud Gulf were not observed.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: These areas had consolidated lightly ridged winter ice in giant and field floes. Cracks were observed in Rae Strait. The southern and eastern areas of Rasmussen Basin and the northern half of James Ross Strait were not observed.

M^CCLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: The area was not observed.

BELLOT STRAIT: The area was not observed.

Snow cover was continuous throughout all the above-described areas.

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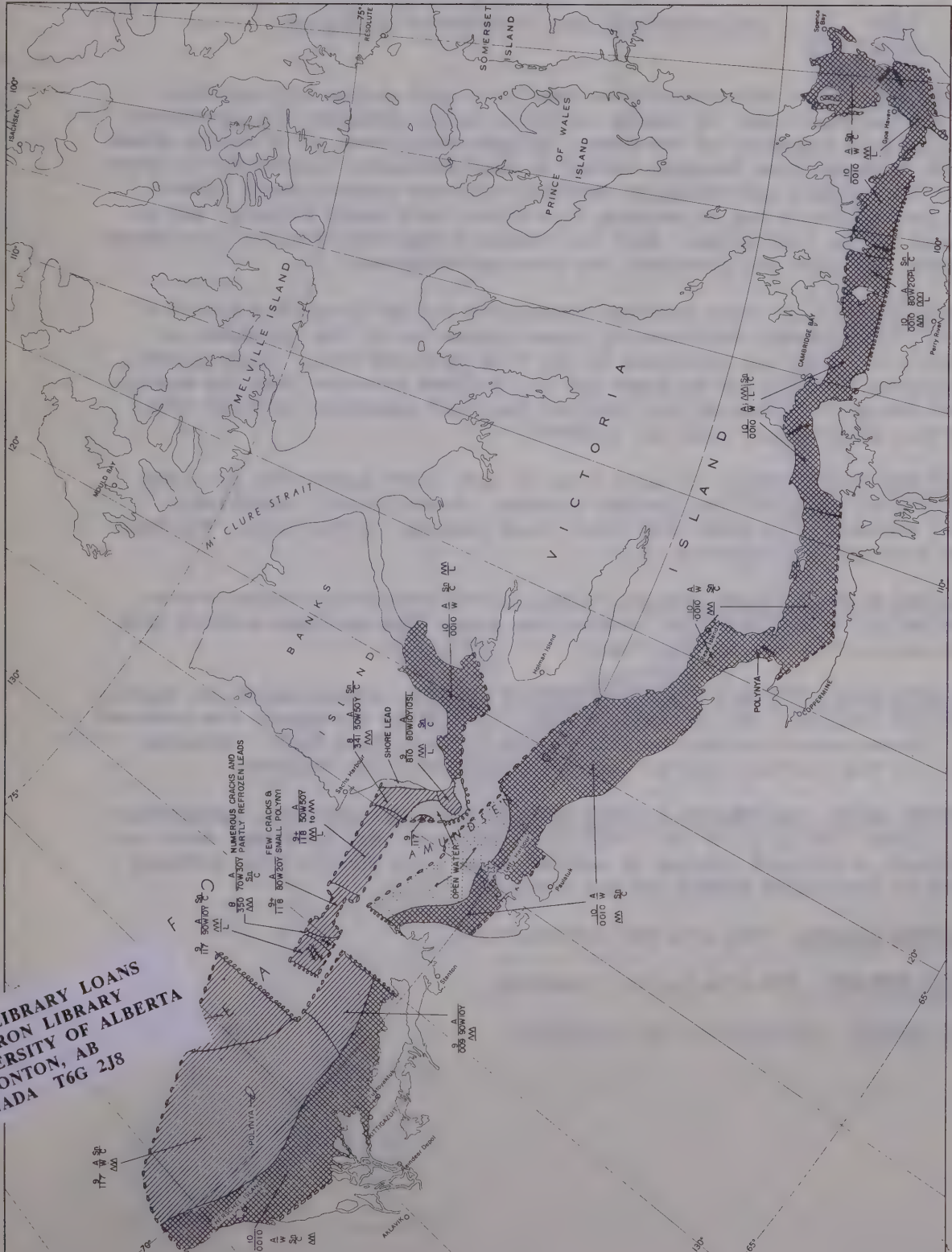


Fig. 1. - Observed Ice Conditions, April 25 - 26, 1960.

ICE CONDITIONS ON MAY 23 - 24, 1960.

Ice conditions are illustrated in fig. 2

BEAUFORT SEA: Fast and consolidated heavily-ridged winter ice continued along the mainland coast to twenty to thirty miles offshore, and northwards in the western extremity of the area. An open water area up to thirty miles in width extended from Herschel Island to Cape Bathurst, broadening to cover most of the western approaches to Amundsen Gulf and coastal Banks Island. Close, mainly winter ice in varying floe sizes, with heavy ridging, lay to the north of the open water. Fast ice remained from Cape Kellett northwards. The Mackenzie Delta and Liverpool Bay were not observed.

AMUNDSEN GULF: Open water extended throughout the north-western sector of the gulf, with a small intrusion of close winter ice to the southwest of Cape Kellett. Fast ice continued in the Cape Bathurst area. Consolidated, heavily ridged winter ice in giant and field floes extended over the eastern half of the gulf. Franklin Bay, Darnley Bay, and immediate northern area, and Prince Albert Sound were not observed.

DOLPHIN AND UNION STRAIT: A small area of open water surrounded by close winter ice existed near the Lambert Islands. Consolidated, moderately-ridged, winter ice in giant and field floes remained in the area. The Read Island area was not observed.

CORONATION GULF AND DEASE STRAIT: Consolidated, moderately-ridged winter ice, sized up to medium floes, covered the area. The mainland coastal area of Coronation Gulf was not observed.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Consolidated and lightly-ridged and hummocked predominantly winter ice existed throughout the observed area. Cracks were noted at the western end of Queen Maud Gulf. Victoria Strait and the southern half of Queen Maud Gulf were not observed.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: Consolidated, moderately-ridged winter ice in giant and field floes extended over Rasmussen Basin and Rae Strait, with light ridging in central James Ross Strait. The northern portion of James Ross Strait was not observed.

M'CLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: The area was not observed.

BELLOT STRAIT: The area was not observed.

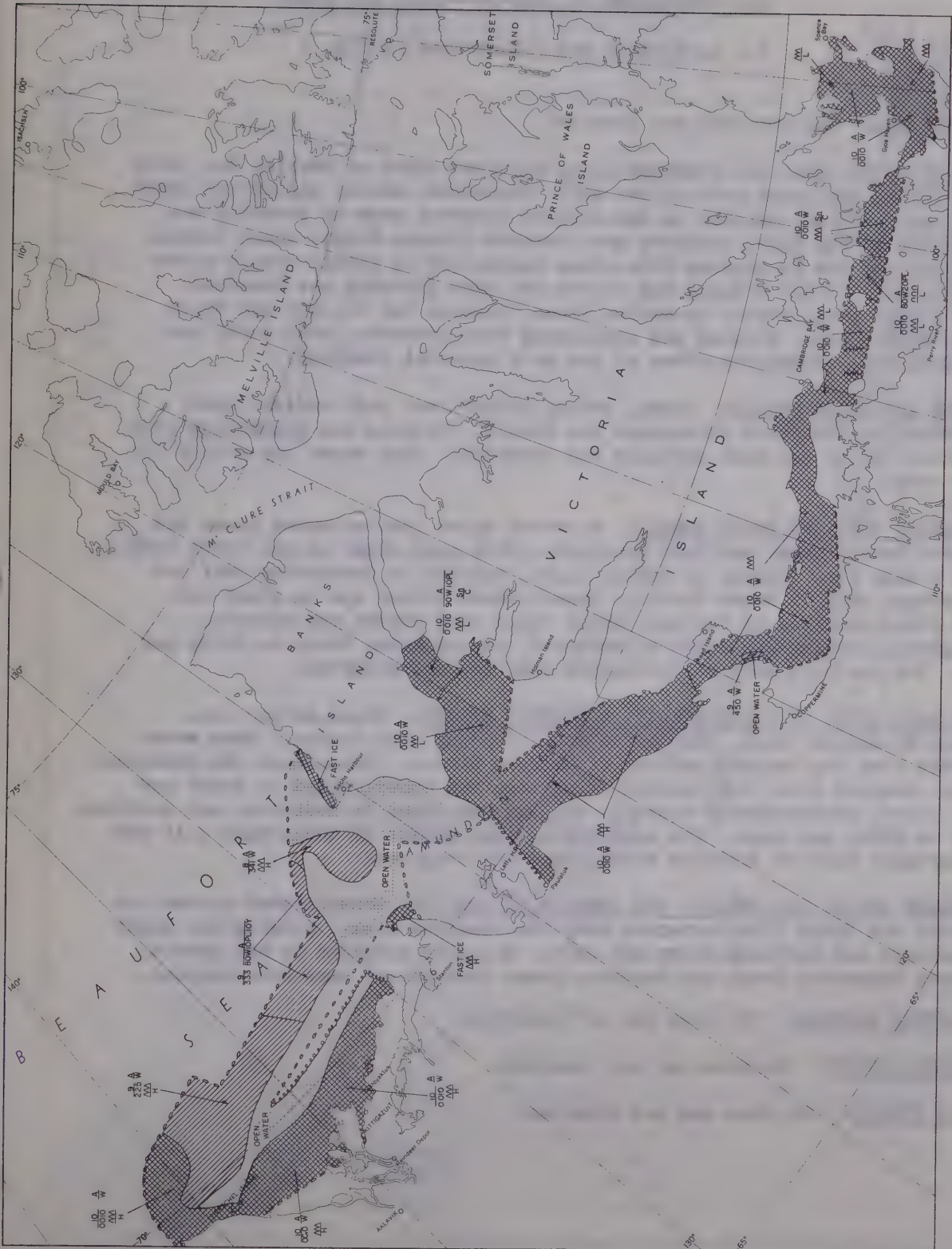


Fig. 2. - Observed Ice Conditions, May 23 - 24, 1960.

ICE CONDITIONS ON JUNE 29 - JULY 10, 1960.

Ice conditions are illustrated in fig. 3

BEAUFORT SEA: The area was not observed.

AMUNDSEN GULF: Fast ice remained along the west coast of Darnley Bay, with close ice in the lower half of the bay. Scattered, mainly winter ice sized up to medium floes, existed in the eastern observed area of Franklin Bay and in the thirty miles offshore area towards Clinton Point, where broken, mainly winter ice in varying floe sizes approached to within twenty miles of the coast. Light ridging and thirty per cent puddling was observed. Close winter ice, largely in medium floes, covered the Dolphin and Union Strait approaches. Ridging and hummocking were moderate, with forty per cent puddling. Remaining areas of the gulf were not observed.

DOLPHIN AND UNION STRAIT: Close, mainly winter ice, with medium floes predominating, extended throughout the strait. Ridging and hummocking were moderate. Forty per cent puddling was observed. Open water lay within all inner bays.

CORONATION GULF AND DEASE STRAIT: A narrow shore lead extended along the Victoria Island coast and Kent Peninsula, with open water in all inner bays. Close winter ice, largely in medium floes, existed in Coronation Gulf and the western half of Dease Strait. Consolidated winter ice in giant and field floes occurred to the east where there were cracks and polynia. Throughout, ridging was light to moderate, and puddling forty to fifty per cent. The southern half of Coronation Gulf was not observed.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Close winter ice, largely in medium floes, lay to the east of Jenny Lind Island. Open water extended over the central portion of Simpson Strait. Throughout the remainder of the observed area, ice concentration remained consolidated in giant and field floes, predominantly winter. Ridging was light to moderate, and puddling forty to fifty per cent. The southern coastal waters of Queen Maud Gulf and the northern half of Victoria Strait were not observed.

RASMUSSEN BASIN, RAE STRAIT, AND JAMES ROSS STRAIT: Consolidated winter ice in giant and field floes extended over the observed area. Ridging was light to moderate and puddling fifty per cent. Polynias occurred in Rae Strait. Southern Rasmussen Basin and northern James Ross Strait were not observed.

M^CCLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: The area was not observed.

BELLOT STRAIT: The area was not observed.



ICE CONDITIONS ON JULY 14 - 15, 1960.

Ice conditions are illustrated in fig. 4

BEAUFORT SEA: Open water now extended through the Mackenzie Delta area and eastern Liverpool Bay. Scattered to broken ice lay in the vicinity of Herschel Island, with close ice offshore becoming consolidated polar ice in giant and field floes along the northern boundary which extended towards Banks Island. Broken ice covered the area to the north of the Mackenzie Delta and in a narrow offshore strip to Cape Bathurst. Extensive open water covered the remainder of the area. Moderately ridged winter ice, sized up to medium floes, predominated, with puddling of sixty per cent on winter and thirty per cent on polar floes.

AMUNDSEN GULF: Over the west and northwest sector, and in Darnley Bay and adjacent area, open-water conditions prevailed. Broken, mainly winter ice in small and medium floes covered Franklin Bay and along the coastal area eastwards from Clinton Point. Ridging was light. Close, moderately-ridged winter ice, with giant and field floes predominating, extended over the central area of the gulf to Dolphin and Union Strait. Puddling generally was sixty per cent, becoming rotten. The northeast sector of the gulf was not observed.

DOLPHIN AND UNION STRAIT: Broken, lightly ridged winter ice covered the Strait. Small areas of scattered ice and open water existed to the east. Sixty per cent rotten puddling was observed.

CORONATION GULF AND DEASE STRAIT: Open-water conditions prevailed in the Coppermine and Cambridge Bay areas. In the central sector of the gulf, scattered winter block and small floes existed along the Victoria Island coast, with broken small and medium floes to the south. Close winter ice, sized up to medium floes, covered the eastern end of the gulf and south-eastern Dease Strait. Broken winter ice, sized up to medium floes, prevailed in the central sector of the strait. Ridging was light to moderate, with sixty per cent rotten puddling.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Shore leads existed along the Victoria Island coast, to the west of Perry River, and in the Simpson Strait area. The western half of Simpson Strait had open water, with close winter ice to the east. Consolidated winter ice remained in the northeastern gulf, with a lead separating it from the close, mainly winter ice in varying floe sizes which covered remaining gulf areas. Fifty per cent rotten puddling was observed. Close, mainly winter ice in giant and field floes, moderately ridged and heavily hummocked, covered the majority of Victoria Strait, with a small area of broken winter ice along the Victoria Island coast. Puddling was forty per cent.

RASMUSSEN BASIN, RAE STRAIT, AND JAMES ROSS STRAIT: Close, lightly-ridged winter ice in giant and field floes extended over Rasmussen Basin, with broken winter ice sized up to medium floes in the extreme south and in Rae Strait. Consolidated winter ice covered the northern and southern sections of James Ross Strait, with close ice in the east coastal area and open water to the west. Puddling generally was fifty per cent.

M'CLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: Consolidated winter ice covered the immediate coastal area to the north of James Ross Strait. The remainder of the area was not observed.

BELLOT STRAIT: The area was not observed.



Fig. 4. - Observed Ice Conditions, July 14 - 15, 1960.

ICE CONDITIONS ON JULY 18 - 23, 1960.

Ice conditions are illustrated in fig. 5

BEAUFORT SEA: The area was not observed.

AMUNDSEN GULF: The area was not observed.

DOLPHIN AND UNION STRAIT: Broken rotting winter ice, sized up to medium floes, extended over the eastern approaches and along the northern side of the strait. To the south, scattered ice prevailed, with a small patch of broken ice near the eastern entrance.

CORONATION GULF AND DEASE STRAIT: Scattered winter ice in block and small floes extended over central areas of the gulf, with open water in the southwestern third and to the south of Kent Peninsula. Broken winter ice, sized up to medium floes, covered the extreme east of the gulf and western quarter of Dease Strait. Scattered block and small floes extended eastwards with open water in the eastern half of the strait. Patches of close winter ice had encroached into bays along the northern coast. Throughout, ridging was light and puddling rotten.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Open water extended from Dease Strait to Jenny Lind Island and the southwestern coastal area of the gulf, to the north of Simpson Strait, and northwards from Hat Island into eastern Victoria Strait. Scattered winter ice in block and small floes extended over the Jenny Lind Island area and to the southwest of Hat Island. Broken winter ice, sized up to medium floes, lay to the north of Perry River. Close winter ice, with medium floes predominating, covered the southeastern gulf area and approaches to Simpson Strait. In Simpson Strait, broken winter ice mainly in block and small floes had covered the western half whilst the eastern half remained open water. Close, mainly winter ice in varying floe sizes extended over the majority of Victoria Strait, with consolidated ice to the east and open water along the Victoria Island coast. Throughout, ridging and hummocking were moderate, with fifty per cent puddling.

RASMUSSEN BASIN, RAE STRAIT, AND JAMES ROSS STRAIT: Open water extended along the coast of King William Island and in Shepherd Bay. Close, mainly winter ice, sized up to medium floes, covered Rasmussen Basin and Rae Strait, with giant and field floes predominating in James Ross Strait. Ridging was moderate and puddling sixty per cent.

M^CCLINTOCK CHANNEL: Close, mainly winter ice in varying floe sizes extended over the extreme southern observed area. Ridging and hummocking were moderate. Sixty per cent puddling was observed.

FRANKLIN STRAIT: Observations were confined to the extreme southern area where consolidated, largely winter ice in giant and field floes prevailed. Puddling was sixty per cent.

BELLOT STRAIT: The area was not observed.

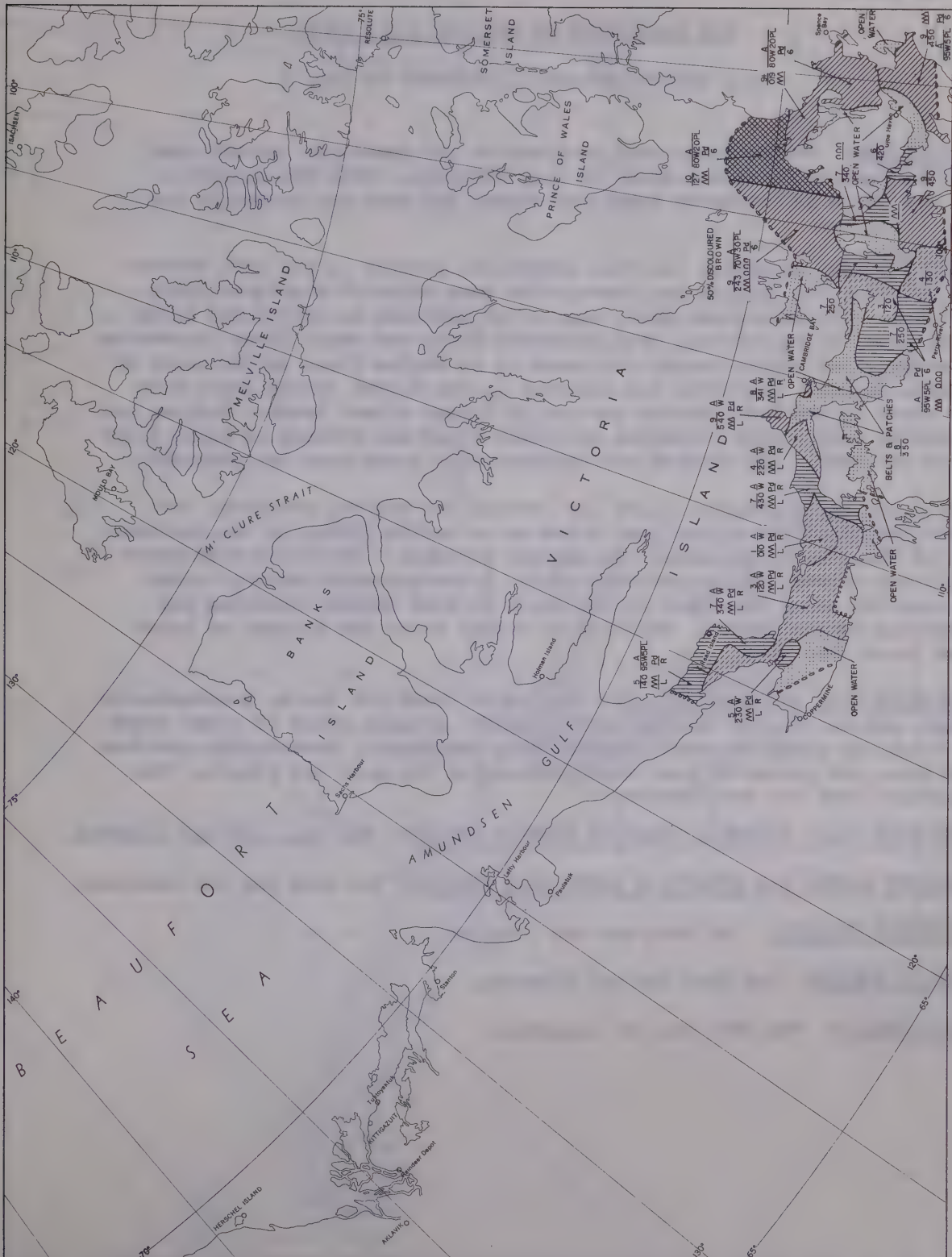


Fig. 5. - Observed Ice Conditions, July 18 - 23, 1960.

ICE CONDITIONS ON JULY 24 - 27, 1960.

Ice conditions are illustrated in fig. 6

BEAUFORT SEA: Observations were confined to the immediate coastal zone from the eastern Mackenzie Delta to Cape Bathurst. With the exception of a few belts of scattered brash and block, the area was generally ice-free.

AMUNDSEN GULF: Generally ice-free conditions existed in the area between Cape Bathurst and Darnley Bay, except for some belts of scattered brash and block. In the eastern gulf, open water narrowed to within ten miles of the coast at Cape Young, with scattered block and small floes increasing to become close mainly winter ice sized up to medium floes to the coast of Victoria Island. Scattered ice occurred in the Holman Island area, with open water in the northeastern portion of Prince Albert Sound. Ridging and hummocking were heavy. Puddling on winter floes was rotten; on polar floes thirty per cent. The central and northern gulf areas were not observed.

DOLPHIN AND UNION STRAIT: Close ice covered the western entrance, with broken predominantly winter ice, sized up to medium floes, in the southern half of the strait and across the eastern entrance. Generally open-water conditions existed in the northern half. A two-mile-wide belt of close ice occurred along the coast to the south of Read Island. Ridging and hummocking were moderate. Puddling on winter floes was rotten; on polar floes thirty per cent.

CORONATION GULF AND DEASE STRAIT: Scattered brash and block, predominantly winter, existed in the extreme western gulf. A small patch of close brash and block lay along the west coast of Kent Peninsula. Essentially ice-free conditions now prevailed over the remainder of the gulf and strait. The Coppermine area was not observed.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: The area was not observed.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: The area was not observed.

M'CLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: The area was not observed.

BELLOT STRAIT: The area was not observed.

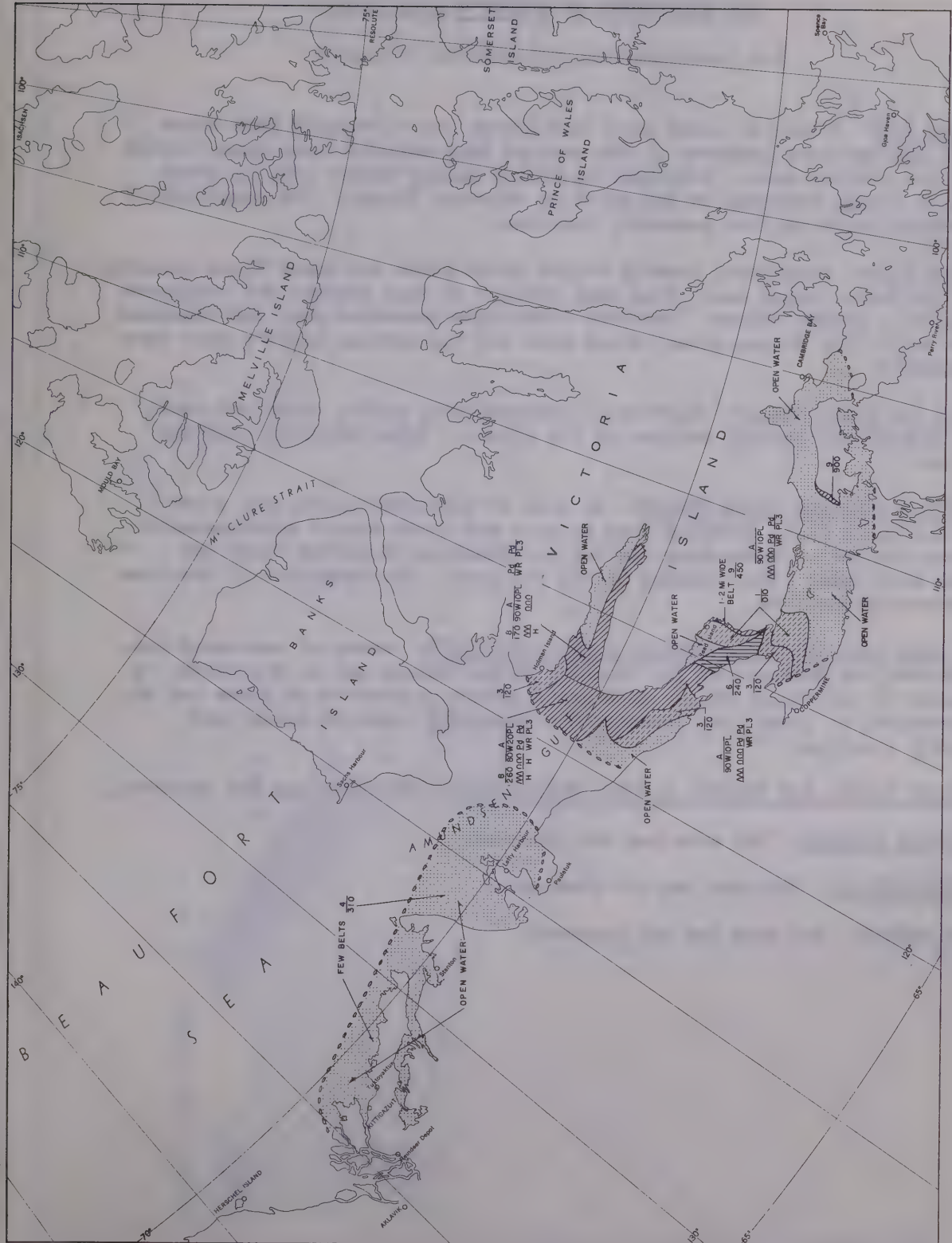


Fig. 6. - Observed Ice Conditions, July 24 - 27, 1960.

ICE CONDITIONS ON AUGUST 4 - 5, 1960.

Ice conditions are illustrated in fig. 7

BEAUFORT SEA: Broken to close polar and winter ice in varying floe sizes covered the northern boundary to the west of Cape Kellett, with consolidated ice in the extreme west. Scattered to broken mainly winter ice, in block and small floes, occurred to the north of Herschel Island. The remainder of the observed area was now generally ice-free.

AMUNDSEN GULF: Scattered, heavily ridged polar block and small floes extended along the Banks Island coast from Cape Kellett to Cape Lambert and continued in a belt to Holman Island. Ice-free conditions prevailed over the remainder of the gulf. The Prince Albert Sound area and the extreme eastern gulf were not observed.

DOLPHIN AND UNION STRAIT: Scattered, predominantly polar, block and small floes covered the central portion of the strait. Other sections were not observed.

CORONATION GULF AND DEASE STRAIT: An area of scattered winter and polar block and small floes extended from Dolphin and Union Strait southeastward to cross the gulf. Hummocking was heavy. Puddling on winter floes was rotten, with polar floes puddled thirty per cent. The remainder of the area was generally ice-free.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Areas of scattered rotting winter ice occurred in the vicinity of Hat Island and to the south. A few belts of scattered ice lay in Simpson Strait with belts of close ice to the northwest of Jenny Lind Island. The remaining observed areas were generally ice-free.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: The area was not observed.

M'CLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: The area was not observed.

BELLOT STRAIT: The area was not observed.

ICE CONDITIONS ON AUGUST 15 - 24, 1960.

Ice conditions are illustrated in fig. 8

BEAUFORT SEA: The area was not observed.

AMUNDSEN GULF: Ice-free conditions prevailed in observed areas in the vicinity of Letty Harbour, Holman Island and Prince Albert Sound, and in the extreme eastern gulf.

DOLPHIN AND UNION STRAIT: The area was now essentially ice-free.

CORONATION GULF AND DEASE STRAIT: Generally ice-free conditions extended throughout the area.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Queen Maud Gulf, Simpson Strait, and the Victoria Island coastal zone were generally free of ice. Scattered winter and polar ice in block and small floes occurred in the southern portion of Victoria Strait, with broken to close winter and polar ice sized up to medium floes to the north. Puddling on winter floes was rotten, with polar floes puddled at fifty per cent.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: In the south-western part of James Ross Strait scattered to close ice lay along the coast of King William Island. Generally ice-free conditions existed in remaining areas. The northern half of James Ross Strait was not observed.

M^cCLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: Broken to close winter and polar ice, giant and field floes predominating, extended northwards from King William Island to the southern entrance to Franklin Strait. Scattered polar and winter ice in block and small floes continued northwards, with generally ice-free conditions to the north of Bellot Strait. Some broken polar and winter ice in block and small floes remained along the coast of Prince of Wales Island. Puddling on winter floes was rotten, with polar floes puddled at forty to fifty per cent. Ridging and hummocking were moderate. The northern half of the strait was not observed.

BELLOT STRAIT: Close, predominantly polar ice, sized up to medium floes, extended throughout the strait and immediate approaches.

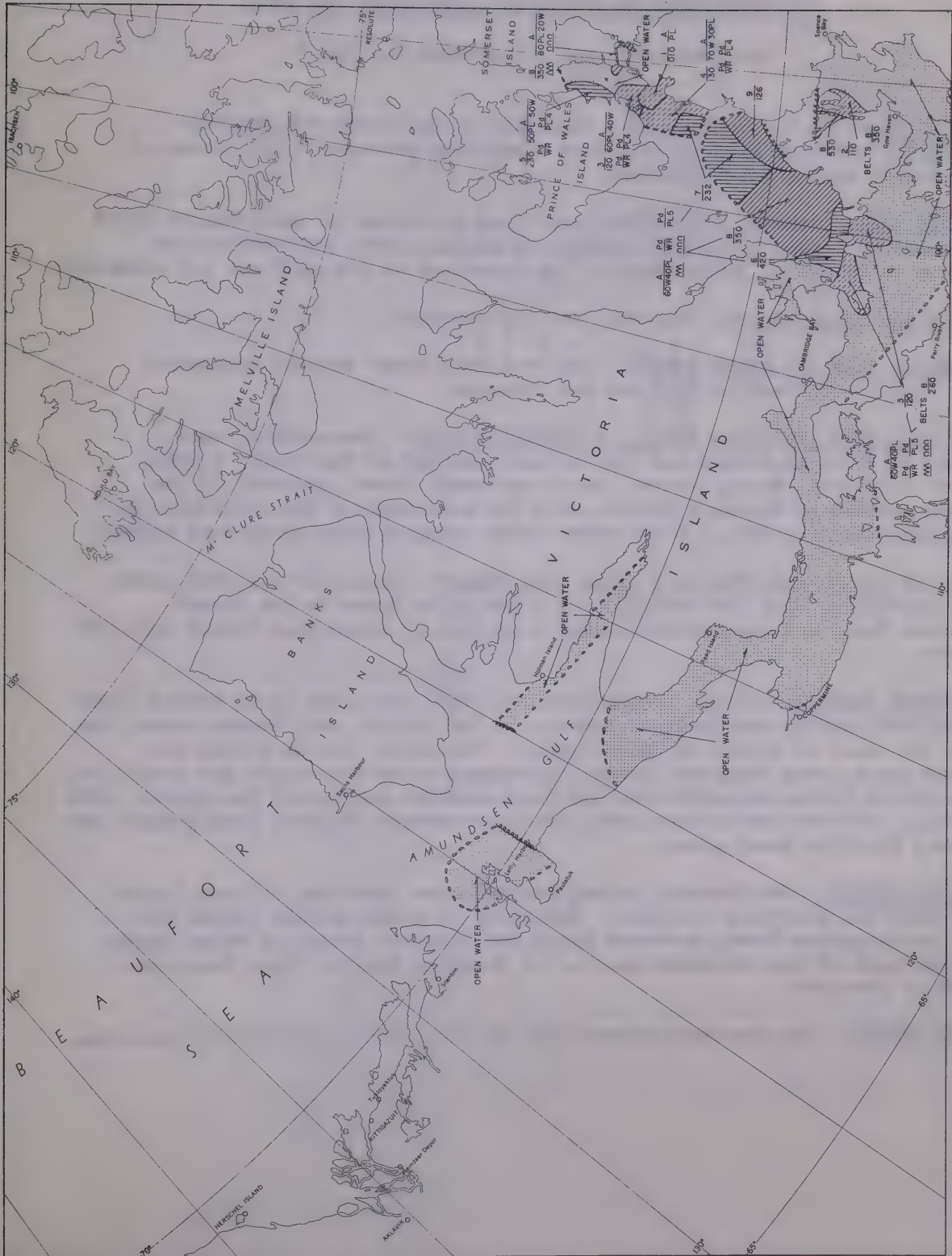


Fig. 8. - Observed Ice Conditions, August 15 - 24, 1960.

ICE CONDITIONS ON AUGUST 28 - SEPTEMBER 10, 1960.

Ice conditions are illustrated in fig. 9

BEAUFORT SEA: In the coastal zone from Aklavik westwards and between Tuktoyaktuk and Cape Kellett, ice-free conditions existed. Other areas of the Beaufort Sea were not observed.

AMUNDSEN GULF: Generally ice-free conditions prevailed in the southern third of the gulf. Broken polar ice, largely in medium floes, occurred at the entrance to Prince of Wales Strait. The remainder of the gulf was not observed.

DOLPHIN AND UNION STRAIT: The area was not observed.

CORONATION GULF AND DEASE STRAIT: Ice-free conditions existed throughout Dease Strait. Coronation Gulf was not observed.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Observations were limited to Victoria Strait and the northern quarter of the gulf. A small area of scattered, mainly winter, block and small floes, occurred in the western portion of Victoria Strait, with the remainder of the observed area being generally ice-free. A few polar floes occurred near Jenny Lind Island.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: Generally ice-free conditions prevailed, with the exception of a few polar floes in Rae Strait. Rasmussen Basin and the extreme northern portion of James Ross Strait were not observed.

M'CLINTOCK CHANNEL: Close, predominantly winter, ice sized up to medium floes covered the central and southern portion of the strait, with broken winter ice along the coast of Prince of Wales Island. Scattered, mainly winter ice, covered the extreme southern strait. Scattered to broken winter and polar ice, up to medium floes, extended over the north-eastern quarter of the strait, with generally ice-free conditions along the north-eastern Victoria Island coast and Viscount Melville Sound area.

FRANKLIN STRAIT: The Somerset Island coastal area from King William Island northwards was generally ice-free. Scattered to broken mainly winter ice, sized up to medium floes, extended along the coast of Prince of Wales Island and over most of the southwest portion of Franklin Strait. Peel Sound was generally ice-free.

BELLOT STRAIT: The observed western half of the strait was generally ice-free.



ICE CONDITIONS ON OCTOBER 19 - 23, 1960.

Ice conditions are illustrated in fig. 10

BEAUFORT SEA: Broken young ice and slush occurred in a narrow observed area northeast from Herschel Island, becoming close winter and young ice in giant and field floes to the northeast of the Mackenzie Delta and to the west of Banks Island. Close young ice and slush, up to medium floes, extended over eastern Liverpool and the Cape Bathurst area. Rafting and ridging were moderate to heavy. The Mackenzie Delta was not observed.

AMUNDSEN GULF: Close young ice and ice crust in medium and giant floes extended over the coastal area from Cape Bathurst to Cape Young, off southwestern Banks Island, and in the Holman Island area. Rafting and ridging were moderate to heavy. The central gulf was not observed.

DOLPHIN AND UNION STRAIT: Broken young ice and ice crust extended westwards from the Lambert Islands, with broken slush to the east. Rafting was moderate to heavy.

CORONATION GULF AND DEASE STRAIT: Generally ice-free conditions prevailed in the central gulf, with scattered slush to the west of Duke of York Archipelago, and broken young ice and ice crust to the west of Kent Peninsula. Coastal areas and the western quarter of the gulf were not observed. Close young ice and ice crust covered Dease Strait.

QUEEN MAUD GULF, VICTORIA STRAIT, & SIMPSON STRAIT: Close to consolidated young, winter ice and ice crust in giant and field floes covered Victoria Strait. Queen Maud Gulf and Simpson Strait. Queen Maud Gulf and Simpson Strait were not observed.

RASMUSSEN BASIN, RAE STRAIT, & JAMES ROSS STRAIT: Rae Strait and the southern half of James Ross Strait had close young ice and ice crust in giant and field floes, with consolidated winter and young ice to the north. Rasmussen Basin was not observed.

M'CLINTOCK CHANNEL: The area was not observed.

FRANKLIN STRAIT: Consolidated young, winter and polar ice extended throughout the strait and southern area.

BELLOT STRAIT: The strait remained generally ice-free, with consolidated ice covering the eastern and western approaches.

Fast ice covered bays and inlets throughout all described areas.



Fig. 10. - Observed Ice Conditions, October 19 - 23, 1960.

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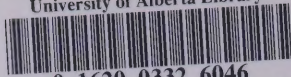
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